

Equilibrium II

1) Solve for T_1 and T_2

$$\begin{aligned} T_1 \cos(30^\circ) + T_2 \cos(50^\circ) &= 688 \\ T_1 = \frac{2T_2 \cos(50^\circ)}{\sqrt{3}} \end{aligned}$$

$$\begin{aligned} T_1 \sin(30^\circ) + T_2 \sin(50^\circ) &= 688 \\ \Rightarrow \frac{T_1}{2} + T_2 \sin(50^\circ) &= 688 \\ \Rightarrow T_2 \left(\frac{\cos(50^\circ)}{\sqrt{3}} + \sin(50^\circ) \right) &= 688 \end{aligned}$$

$$\frac{T_1}{2} + 605 \sin(50^\circ) = 688$$

$$\Rightarrow T_1 = 688 - 605 \sin(50^\circ)$$

$$\therefore T_1 = 2(688 - 605 \sin(50^\circ)) = 449.1 \text{ N.}$$

2) Solve for T_1 and T_2

$$\begin{aligned} T_1 \cos(29^\circ) &= T_2 \cos(44^\circ) \\ T_2 &= \frac{T_1 \cos(44^\circ)}{\cos(29^\circ)} \end{aligned}$$

$$\begin{aligned} T_1 \sin(29^\circ) + T_2 \sin(44^\circ) &= 488 \\ \Rightarrow T_2 \left[\frac{\cos(44^\circ) \sin(29^\circ)}{\cos(29^\circ)} + \sin(44^\circ) \right] &= 488 \\ \Rightarrow T_2 = \frac{488}{\left[\frac{\cos(44^\circ) \sin(29^\circ)}{\cos(29^\circ)} + \sin(44^\circ) \right]} \end{aligned}$$

$$\therefore T_2 = \frac{488}{446.3} \text{ N.}$$

3) Solve for T_1 and T_2

$$\begin{aligned} T_1 &= \frac{W \cos(36^\circ)}{\sin(T_1 + T_2)} \\ &= \frac{991 \cos(36^\circ)}{\sin(71^\circ + 36^\circ)} \end{aligned}$$

$$\begin{aligned} T_2 &= \frac{W \cos(T_1)}{\sin(71^\circ + 36^\circ)} \\ &= \frac{991 \cos(71^\circ)}{\sin(107^\circ)} \end{aligned}$$

$$\therefore T_2 = 337.4 \text{ N.}$$

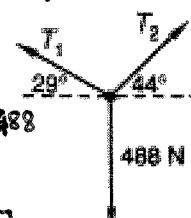
4) Solve for T_1 and T_2

$$T_1 = \frac{9496 \cos(0^\circ)}{\sin(0^\circ + 35^\circ)}$$

$$T_2 = \frac{9496 \cos(35^\circ)}{\sin(0^\circ + 35^\circ)}$$

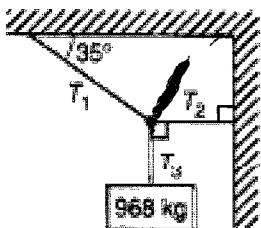
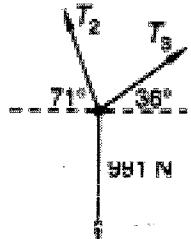
$$T_1 = 16555.8 \text{ N}$$

$$\therefore T_2 = 9496 \text{ N}$$



$$\begin{aligned} T_1 &= \frac{T_2 \cos(44^\circ)}{\cos(29^\circ)} \\ &= \frac{946.3}{\cos(29^\circ)} \text{ N.} \end{aligned}$$

$$\therefore T_1 = 361.1 \text{ N.}$$



$$T_3 = 9496 \text{ N} (9.81 \text{ m/s}^2)$$

5) Solve for T_1 and T_2

$$\begin{aligned} T_1 &= \frac{412 \cos(30^\circ)}{\sin(90^\circ)} \\ &= 412 \cos(30^\circ) \\ &= 356.8 \text{ N.} \end{aligned}$$

$$\begin{aligned} T_2 &= 412 \cos(60^\circ) \\ &= 206 \text{ N.} \end{aligned}$$

